

Claims

1. A method of counting currency notes, comprising:

5 step 1 of feeding a currency note into an apparatus by detecting the currency note placed on a hopper using a hopper sensor and then driving a motor and a clutch;

 step 2 of detecting states of the fed currency note and then handling multiple feed/chain feed/jam feed errors based on the detection results;

 step 3 of detecting the fed currency note, recognizing denomination of the currency note by scanning the image thereof, and extracting, storing and outputting an
10 image of serial number region of the fed currency note; and

 step 4 of incrementing a count when denomination of the currency note has been recognized, and discharging the currency note to a stacker and a reject pocket based on the recognition results.

15 2. The method as set forth in claim 1, wherein the step 3 comprises:

 step 3-1 of scanning the currency note in lines and storing the scanned images in an internal memory in an image data form;

 step 3-2 of finding contours of the currency note from the image data stored in the internal memory;

20 step 3-3 of compensating for skew or geometrical distortion of the image data by geometrically correcting and preprocessing the image data;

 step 3-4 of recognizing denomination of the currency note from the compensated image data using a pattern recognizing method employing template matching in accordance with the inserted direction of the currency note;

25 step 3-5 of setting serial number region and extracting the image of the serial

number region for the currency note whose denomination have been recognized using previously known serial number position information with respect to the recognized denomination;

5 step 3-6 of converting the extracted image data into normalized image data of a certain size; and

 step 3-7 of storing and outputting the image data.

3. The method as set forth in claim 1, wherein, in the step 3, the image of the serial number region is output, together with text data obtained through character recognition of
10 the image data.

4. The method as set forth in claim 2, further comprising the step of correcting the compensated image data when top and bottom of the currency note is reversed, between
15 step 3-3 and step 3-4.

5. The method as set forth in claim 4, further comprising the step of converting the normalized image data into binary data between step 3-6 and step 3-7, wherein, in step 3-8, the binary data are stored and output.

20 6. An apparatus for counting currency notes, comprising:

 an automatic feeder unit for feeding a plurality of currency notes placed on a hopper one by one;

 a drive unit for driving a motor when a hopper sensor detects the plurality of currency notes;

25 a control unit for detecting states of the fed currency notes and handling multiple

feed/chain feed/jam errors;

a sensor unit for detecting the currency notes and scanning an entire image of the currency notes;

5 a signal processing unit for recognizing denominations of the currency notes from image data of the currency notes input from the sensor unit, extracting serial number regions with respect to each of the recognized denominations, and converting the extracted data into normalized image data of a constant size;

a transfer unit for transferring the fed currency notes to an outlet;

10 a selector unit for selectively discharging the currency notes to a stacker and a reject pocket in accordance with process results of the currency notes; and

an output unit for outputting stored image data to a printer.

7. The apparatus as set forth in claim 6, wherein the signal processing unit outputs text data obtained through character recognition of the stored image data, together with the
15 stored image data, through the output unit.

8. The apparatus as set forth in claim 6, wherein the signal processing unit finds contours of the image data of the currency notes input from the sensor unit, compensates skew or geometrical distortion of the currency notes by calculating information about
20 skews of the currency notes, checks inserted directions of the currency notes, and recognizes denominations of the currency notes using a pattern recognizing method employing template matching.

9. The apparatus as set forth in claim 6, wherein the signal processing causes the
25 compensated image data to be upside down when a top and a bottom thereof are reversed.

10. The apparatus as set forth in claim 6, wherein the signal processing unit converts the normalized image data into binary data and stores the binary data.